AMENDMENTS TO THE CLAIMS

1-54. (Canceled)

55. (Currently amended) A method for producing a coating on a moving substrate in a vacuum chamber with a residual gas employing a sputtering apparatus, wherein said coating is formed from at least two constituents, a first constituent is a sputter material of said sputtering apparatus and a second constituent is a reactive component of said residual gas, the method comprising the steps of:

~~reactive sputter depositing, with a delivery of said reactive component, said coating on said substrate with a given stoichiometric deficit of said second constituent in a spatial area of said sputtering apparatus;~~

reactive sputter depositing said coating on said substrate with a given stoichiometric deficit of said second constituent to provide a substoichiometric compound of said coating;

moving said substrate with said deposited coating in a spatial area of a plasma source which is arranged in said vacuum chamber at a predetermined distance from said sputtering apparatus; and

performing plasma activation on said substoichiometric compound of said coating with an input of a predetermined amount of said reactive component to provide a fully stoichiometric coating.

~~modifying a structure and/or stoichiometry of said coating on said substrate by a subsequent plasma treatment by said plasma source with an input of a predetermined amount of said reactive component to reduce an optical loss of said coatimg.~~

56. (Currently amended) A method for producing a coating on a moving substrate in a vacuum chamber with a residual gas employing a sputtering apparatus, wherein said coating is formed from at least two constituents, a first constituent is a sputter material of said sputtering apparatus and a second constituent is a reactive component of said residual gas, the method comprising the steps of:

~~reactive sputter depositing, with a delivery of said reactive component, said coating on said substrate in a spatial area of said sputtering apparatus, said coating being of a predetermined coating thickness and having an optical loss below a predetermined minimum;~~

reactive sputter depositing said coating on said substrate with a given stoichiometric deficit of said second constituent to provide a substoichiometric compound of said coating having a predetermined coating thickness and having an optical loss below a predetermined minimum;

moving said substrate with said deposited coating in a spatial area of a plasma source which is arranged in said vacuum chamber at a given distance from said sputtering apparatus; and

performing plasma activation on said substoichiometric compound of said coating with an input of a predetermined amount of said reactive component to provide a fully stoichiometric coating.

~~modifying a structure and/or stoichiometry of said coating on said substrate by a subsequent plasma treatment by said plasma source while supplying a predetermined amount of said reactive component to reduce an optical loss in said coating.~~

57. (Previously presented) The method of claim 56, further comprising the step of operating said sputtering apparatus at a working point on a characteristic line or a

characteristic map in accordance with said sputter material and a reactive gas material.

58. (Previously presented) The method of claim 56, further comprising the step of optically monitoring said coating to adjust optical properties of said coating after a deposit of said predetermined coating thickness.

59. (Previously presented) The method of claim 56, further comprising the step of optically monitoring said coating to adjust optical properties of said coating after said plasma treatment of said coating by said plasma source.

60. (Previously presented) The method of claim 56, further comprising the step of optically monitoring said coating to adjust optical properties of said coating after a deposit of said predetermined coating thickness and after said plasma treatment of said coating by said plasma source.

61. (Previously presented) The method of claim 58, wherein the step of optically monitoring comprises the step of detecting transmission, reflection and/or loss at one or more wavelengths of said coating.

62. (Previously presented) The method of claim 56, further comprising the step of regulating said sputtering apparatus in accordance with a monitoring signal from an optical monitor apparatus.

63. (Previously presented) The method of claim 56, further comprising the step of regulating said plasma source in accordance with a monitoring signal from an optical monitor apparatus.

64. (Previously presented) The method of claim 58, further comprising the step of performing optical monitoring at predetermined times and/or predetermined coating thicknesses.

65. (Previously presented) The method of claim 56, further comprising the step of increasing the content of said reactive component in said coating to a stoichiometric composition.

66. (Previously presented) The method of claim 56, wherein the step of reactive depositing comprises the step of depositing said coating with a preset deficit between 0 and 100% of said reactive component with respect to said reactive component of said residual gas.

67. (Previously presented) The method of claim 56, further comprising the step of regulating a partial pressure of said reactive component a gas flow of said reactive component and/or by an electric power of said sputtering apparatus.

68. (Previously presented) The method of claim 56, further comprising the step of regulating a sputtering cathode voltage of said by a gas flow of said reactive component.

69. (Previously presented) The method of claim 56, further comprising the step of regulating a quotient of a sputtering rate to a partial pressure of said reactive component a sputtering power.

70. (Previously presented) The method of claim 69, further comprising the step of determining the quotient from the quotient of a first line intensity and a second line intensity, said first line intensity being a measure of said sputtering rate and said second line intensity being a partial pressure of said reactive component.

71. (Previously presented) The method of claim 56, wherein said reactive component is oxygen, carbon and/or nitrogen.

72. (Previously presented) The method of claim 56, further comprising the step of substantially independently establishing partial pressures of said reactive component in the area of said sputtering apparatus and said plasma source.

73. (Previously presented) The method of claim 56, wherein the step of modifying comprises the step of generating a plasma action by said plasma source with a plasma which contains at least said reactive component.

74. (Previously presented) The method of claim 56, wherein the step of modifying comprises the step of modifying said coating to a stoichiometric compound by the substoichiometric composition.

75. (Previously presented) The method of claim 56, further comprising the step of carrying said substrate at a predetermined velocity past said plasma source and/or said sputtering apparatus.

76. (Previously presented) The method of claim 56, further comprising the step of moving said substrate past said plasma source and/or said sputtering apparatus at a variable speed.

77. (Previously presented) The method of claim 56, further comprising the step of moving said substrate repeatedly past said sputtering apparatus and/or said plasma source.

78. (Previously presented) The method of claim 56, further comprising the step of controlling or regulating a gas flow of said reactive component in accordance with optical properties of said coating.

79. (Previously presented) The method of claim 56, further comprising the step of applying heat to said substrate before, during or after the step of modifying.

80. (Previously presented) The method of claim 56, further comprising the step of controlling or regulating a gas flow of said reactive component in accordance with a deposited coating thickness and/or a duration of the modifying step and/or a number of passages past said plasma source.

81. (Previously presented) The method of claim 56, wherein said sputtering apparatus comprises a magnetron-supported cathode sputtering source.

82. (Previously presented) The method of claim 56, further comprising the step of operating said sputtering apparatus with an alternating electrical field.

83. (Currently amended) A method for preparing a multilayer coating with at least one reactively operated coating apparatus and at least one reaction apparatus in a vacuum chamber, comprising the steps of:

~~reactive sputter depositing a second layer with reactive component on at least one substrate moving relative to said coating apparatus or said reaction apparatus;~~

reactive sputter depositing a second layer on at least one substrate moving relative to said coating apparatus or said reaction apparatus with a given stoichiometric deficit of said second constituent to provide a substoichiometric compound of said second layer;

performing plasma activation on said substoichiometric compound of said second layer with an input of a predetermined amount of said reactive component to provide a fully stoichiometric second layer

~~modifying structure and/or stoichiometry of at least one layer on said at least one substrate by a subsequent plasma treatment with said reaction apparatus;~~ and

performing a build-up of an interface layer in a region adjoining a first layer to reduce optical loss in said multilayer coating below a predetermined value, said interface layer having a thickness d1 and a stoichiometric deficit of said reactive component smaller than the stoichiometric deficit of said reactive component in a first layer.

84. (Previously presented) The method of claim 83, further comprising the steps of obtaining values of a momentary thickness d(t) of said second layer during the deposition of said second layer and performing the deposition of said second layer with the stoichiometric deficit of said reactive component greater than the stoichiometric deficit of said reactive component in said first layer as soon as d(t) is greater than d_1.

85. (Previously presented) The method of claim 83, further comprising steps of:

producing at least one layer of said multilayer coating on a moving substrate in a vacuum chamber with a residual gas employing a sputtering apparatus, wherein said multilayer coating is formed from at least two constituents, a first constituent is a sputter material of said sputtering apparatus and a second constituent is a reactive component of said residual gas;

reactive depositing, with a delivery of said reactive component, said multilayer coating on said substrate with a given stoichiometric deficit of said second constituent in a spatial area of said sputtering apparatus;

moving said substrate with said deposited coating in a spatial area of a plasma source which is arranged in said vacuum chamber at a predetermined distance from said sputtering apparatus; and

modifying a structure and/or stoichiometry of said coating via a subsequent plasma action by said plasma source while supplying a predetermined amount of said reactive component to reduce an optical loss of said multilayer coating.

86. (Previously presented) The method of claim 83, further comprising the step of preparing said multilayer coating where one of said first or second layer is low-refracting layer comprising SiO_2 and other of said first or second layer is high-refracting layer comprising at least one of the following: Nb_2O_5 or Ta_2O_5.

87. (Previously presented) The method of claim 86, further comprising the step of preparing multilayer coating where said high-refractive layer comprises Nb_2O_5, said low-refracting layer comprises SiO_2, and said interface layer has said thickness d1 of 2.5-10 nm and the stoichiometric deficit of said reactive component less than 0.5.

88. (Previously presented) The method of claim 83, further comprising the step of selecting, for a given thickness d_1 of said interface layer, a diminishing value of the deficit of said reactive component, for said interface layer as the rate of deposition increases.

89. (Previously presented) The method of claim 83, wherein the step of performing builds-up a number of interfaces (N_1) between high-refracting and low-refracting coatings to be greater than 3.

90. (Previously presented) The method of claim 83, wherein the step of depositing utilizes a magnetron source system; and wherein the step of modifying utilizes a plasma source.

91. (Previously presented) The method of claim 83, further comprising the step of changing texture and/or stoichiometry of said multilayer coating after depositing a layer with a given layer density.

92. (Withdrawn) Apparatus for producing a coating on a substrate with a sputtering apparatus in a vacuum chamber with a residual gas, said coating being formed from at least two constituents and at least a first constituent is a sputter material of said sputtering apparatus and at least a second constituent is a reactive component of said residual gas, comprising:

a device for reactive depositing said coating on said substrate while feeding a reactive component with a predetermined stoichiometric deficit in the vicinity of said sputtering apparatus;

a device for moving said substrate with said deposited coating in the vicinity of a plasma source which is arranged in said vacuum chamber at a predetermined distance from said sputtering apparatus; and

a device for modifying texture and/or stoichiometry of said coating via a plasma treatment by said plasma source while supplying a predetermined amount of the reactive component to reduce an optical loss in said coating.

93. (Withdrawn) Apparatus for producing a coating on a substrate by with a sputtering apparatus in a vacuum chamber with a residual gas, said coating being formed of at least two components, and at least a first constituent is a sputter material from said sputtering apparatus and at least a second constituent is a reactive component of said residual gas, comprising:

a device for reactive depositing said coating on said substrate in the vicinity of said sputtering apparatus while supplying a reactive component with an optical loss falling below a minimum at a given coating thickness;

a device for moving said substrate with said deposited coating in the vicinity of a plasma source which is arranged in said vacuum chamber at a predetermined distance from said sputtering apparatus; and

a device for modifying structure and/or stoichiometry of said coating via a plasma treatment by said plasma source while supplying a predetermined amount of the reactive component to reduce an optical loss in said coating.

94. (Withdrawn) The apparatus of claim 93, further comprising a gas supply and/or a pump unit arranged in the vicinity of said sputtering apparatus and said plasma source and having a pass-through for at least one substrate.

95. (Withdrawn) The apparatus of claim 93, wherein said substrate is arranged on a turntable spaced away from said sputtering apparatus and said plasma source.

96. (Withdrawn) The apparatus of claim 95, wherein several substrates are arranged on said turntable.

97. (Withdrawn) The apparatus of claim 95, wherein said sputtering apparatus and said plasma source are arranged to correspond to the circumference of said turntable.

98. (Withdrawn) The apparatus of claim 93, further comprising at least two sputtering apparatus disposed diametrically opposite one another.

99. (Withdrawn) The apparatus of claim 98, wherein said plasma source is arranged spatially between said two sputtering apparatus.

100. (Withdrawn) The apparatus of claim 98, further comprising an optical measuring device, arranged spatially between said two sputtering apparatus, for measuring an

optical transmission, reflection and/or loss of said coating deposited on said substrate.

101. (Withdrawn) The apparatus of claim 98, further comprising at least one optical measuring apparatus disposed spatially between said two sputtering apparatus.

102. (Withdrawn) The apparatus of claim 100, wherein said optical measuring apparatus is an one-wavelength or multiple wavelength photometer and/or ellipsometer.

103. (Withdrawn) The apparatus of claim 93, further comprising a heating system, arranged at least in an area of said vacuum chamber, for heating said substrate.

104. (Withdrawn) The apparatus of claim 93, wherein said sputtering apparatus is a magnetron-supported cathode sputtering source.

105. (Withdrawn) The apparatus of claim 93, wherein said sputtering apparatus is operated with an alternating electric field in a high-frequency, medium-frequency or pulsed DC range.

106. (Withdrawn) The apparatus of claim 93, wherein said plasma source is one of the following: an electron-cyclotron-wave-resonance (ECWR) source, a Hall End plasma source, a hot cathode DC plasma source, a high-frequency plasma source, a medium-frequency or pulsed DC plasma source.

107. (Withdrawn) Apparatus for producing a multilayer coating, comprising:

at least one reactively operated coating apparatus;

at least one reaction apparatus in a vacuum chamber; and

a control system; and

wherein said coating apparatus is operable to deposit a second layer with at least one reactive component on at least one substrate moving relative to said coating apparatus and said reaction apparatus;

wherein said reaction apparatus is operable to change texture and/or stoichiometry of at least one layer; and

wherein said control system is operable to control said coating apparatus and said reaction apparatus to form an interface layer, in a region of said second layer adjoining a first layer, with a thickness d1 and a value of a deficit of said reactive component DEF lower than a value DEF 1 to reduce an optical loss in said multilayer coating below a predetermined value.

108. (Withdrawn) A multilayer coating produced with at least one reactively operated coating apparatus and at least one reaction apparatus in a vacuum chamber by a method comprising the steps of:

depositing a second layer with reactive component on at least one substrate moving relative to said coating apparatus or said reaction apparatus;

modifying structure and/or stoichiometry of at least one layer with said reaction apparatus; and

performing a build-up of an interface layer with a thickness d1 and a value of a deficit of said reactive component DEF smaller than a value DEF1 in a region adjoining a first layer to reduce optical loss in said multilayer coating below a predetermined value.